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Location, Collocation and Innovation by multinational enterprises: a research agenda

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The distribution of creative economic activity over space has been viewed from three distinct perspectives. International business focuses on the multinational enterprise and the location of activities across national borders; economic geography studies the characteristics of the location site; and innovation scholars are mainly concerned with the technologies and knowledge that arises from the interaction of location and the creativity of actors. All these communities have drawn attention to collocation. However, the nexus of the three literatures is surprisingly thin, in particular with regard to the conditions under which collocation is an advantage or a disadvantage. In this paper, we take stock of the knowledge developed by the three communities and move the discussion further by qualifying a number of these conditions. Based on these considerations, we then propose a number of directions for future research.

Keywords: location and collocation advantages; geography, innovation, international business

Introduction

The most important location decisions of multinational enterprises (MNEs) relate to creative activities and the requisite resources to undertake them. The strategic and economic importance of being able to generate new assets underlays competitive advantage, and firms therefore consider these location decisions with the utmost gravity. These choices are often tied not just to the focal firm's own resources and capabilities, but also to those of other firms that are in close spatial proximity. Such other proximate actors may be suppliers, customers and competitors, and it is well-known that collocation can be either a blessing or a curse. Collocation has both advantages and disadvantages, and firms must weigh one against the other when deciding on their geographical footprint (Cantwell and Santangelo, 2002; Malmberg and Maskell, 2006; Narula and Santangelo, 2009). Substantial research has been conducted in international business, economic geography, and innovation studies on the topic, but the nexus of the three literatures is surprisingly thin. Our knowledge of the conditions under which collocation is an advantage or a disadvantage remains scanty.

As the lead paper in a special issue on this theme, we provide a brief overview of the extant research within the three communities on the geography of economic activities by MNEs. We offer some thoughts on the state of our current understanding, while acknowledging that it is probably too early to claim that the communities have reached a consensus and an intellectual synthesis on the issue. We therefore identify a number of research questions that may guide further investigations.

The papers within this special issue are contributions to what we hope will develop into an integrated framework in the fullness of time.

Location and the MNE: a brief overview

The study of commerce has, since time immemorial, acknowledged that specific activities are associated with particular locations. This line of reasoning posits that certain specific locations are more suitable for particular kinds of economic activity, because specific assets promote the production (or consumption) of a specific good or service, and that assets that make this possible are, by and large, immobile. The consumers of these outputs are likewise assumed to be geographically restricted. Indeed, the principle of trade is built around the movement of goods and services from a geographical locus of production to another physical space where they are consumed.

However, until the rise of the modern firm over the last three centuries, trade, like most economic activity, was a series of staccato (spot-market) transactions between groups of individuals and loosely confederated actors. The growth of international trade, the industrial revolution and the consequent rise of the formal firm (in the modern sense) are closely concatenated. That economic actors might be able to modify the character of the location in which they were situated, and not take it as exogenous, is reflected in the focus of the political economists of the epoch. These scholars consider the character of a location largely to be an endowment of nature. The Alfred Marshall (1920) classic *Principles of Economics* is an early exemplar of the interest in the nature of locational characteristics, although seeking to understand why industrial activity was concentrated in specific geographic locations and industrial activity was a popular theme with 19th century intellectuals and social scientists. Industrial activity was linked with progress and development, and understanding why industry took root in certain locations but not others, was a preeminent concern for nation states, and continues to be so (see Amsden, 1992; Hamilton, 1913; Kunitake, 2009; List, 2016; Wade, 1990).

Classical location theory held that location played a central role in determining profits (Håkanson, 1975). Cost-minimisation through the astute choice of location was shaped by three factors: transportation costs, labour costs and agglomeration economies (Håkanson, 1975; Weber, 1909). It is not coincidental that the early 20th century coincides with the early MNEs, which by this time had begun to actively engage in foreign production (Jones, 2005). Such early investments were what are best described a ‘miniature replicas’ (White and Poynter, 1984), where foreign production was a stripped-down version of the parent company activities, albeit with lower levels (and a smaller variety) of competences and activities. By and large, MNE activities abroad were either subsidiary branches which had no decision-making autonomy and were de facto extensions of the parent; or stand-alone enterprises, with minimal coordination or control exerted post-establishment. It is worth

noting, therefore, that the pioneering studies on location and the MNE by Aharoni (1966), Vernon (1966) and Dunning (1958) shared these suppositions about location choice and the nature of MNE subsidiaries, with the inclusion of market considerations (primarily size) to the location factors (Håkanson, 1975). Therefore, the initial inquiry of the ‘where’ of international business, shared certain insights from the neoclassical canon, and the industrial organisation approach.

The concept of location advantages developed at this time, and reflects these roots. These advantages indicated a comparison between or relative to other locations. Also, the competitiveness of firms in a given location reflected the competitiveness of the location itself (Narula, 2014a). Few MNEs until the 1950s were multinational or multi-plant. Until the 21st century, it was an realistic assumption that firms could be viewed as generic (Beugelsdijk, McCann and Mudambi, 2010). The more the MNE has become spatially and organisationally complex, the greater has become its interdependence upon multiple locations, each with varying degrees of embeddedness (Meyer, Mudambi and Narula, 2011; Narula, 2014a). While the competitiveness of a country has a significant effect on the competitiveness of its firms, it is less so than it was a few decades ago (Cantwell, 1989; Narula, 2012). The modern MNE also has the potential to shape the characteristics of the location, as much as it is shaped by its milieu, as it is multiple embedded in several locations.

Location continues to play a central role in understanding the nature, extent and rate of internationalisation of firms and the evolution of the ‘typical’ MNE. Locations matter not only in a generic sense of countries, but in the sense that locations are about the agglomeration of a variety of activities by a large number of actors who happen to be collocated.

Although country-specific assets are sometimes used as a synonym for L (location) advantages, the term ‘L advantages’ or ‘L assets’ permits an insightful conceptual separation. L assets are a set of characteristics associated with a location, and are in principle accessible and applicable equally to all firms that are physically or legally established in that location. Acquiring information about location-specific conditions is not costless. This knowledge may be available to incumbents (whether domestic or foreign), by virtue of their existing activities on that location, and acquired through experience. These assets may be made available differentially by the actions of governments that seek to restrict (or encourage) the activities of a particular group of actors by introducing structural barriers to their use of certain location-bound assets. These may reflect strategic reasons such as national defence, or the influence of interest groups. However, whether a location-specific asset provides an advantage is not always obvious, or indeed, knowable.

Instead, the term ‘advantage’ implies a subjective assessment, and as such it is probably preferable to use a more neutral term, such as resource (Narula and Santangelo, 2012). The concept of location advantages is endogenous, because the manner in which particular location-bound,

publicly available resources and capabilities are used shapes the value that is created. The presence of other firms and other actors, for instance generates advantages of agglomeration. Overspecialisation of the knowledge infrastructure may act as a location advantage to a particular sector, but act as a disadvantage to firms in unrelated sectors. Therefore, L advantages are about relevant complementary assets outside the boundaries of the MNE that are location-bound (Narula and Santangelo, 2009).

Table 1 summarises the kinds of L advantages. L advantages are associated with a location, and should in principle be accessible equally to all firms that are physically or legally established in that location. L advantages are ‘public’, not in the sense of being ‘public goods’. The use of certain types of L assets can affect their value to others. They are ‘in principle’ available to all, but some are more public than others (Narula, 2014b).

TABLE 1 ABOUT HERE

The first two categories in Table 1 are the classical L advantages are available at marginal (and similar) cost to all economic actors in a given location. They are ‘generic’ and are available to all firms regardless of size, nationality, industry, or geographical unit of analysis. Some are exogenous, and are the natural assets of the location, such as population, climate, accessibility, etc. Others are ‘fruits of the earth’ such as the presence of natural resources, while others are endogenous, because various actors within a system contribute to their development. Examples include skilled and unskilled human capital, health care, utilities, telecoms, ports, security, efficient bureaucracy, public transport etc. Others are sociological or anthropological such as culture, norms, religion, political stability (Narula and Santangelo, 2012).

The second types of L advantages are a function of membership to a system or network of actors. These are ‘members-only’ L advantages, which are also collocation L advantages (Narula, 2014b; Narula and Santangelo, 2012). Collocation L advantage derive from the proximity of other actors, and may be externalities, and are in principle available to all firms in a physical space. Such L advantages are associated with ‘clubs’. Clubs have barriers to entry and create exclusivity. When a certain set of assets is in limited supply, those with access to them do not wish to compete with others through markets for this access. Creating restrictions to new entrants and establishing quasi-internal markets for scarce resources then become a viable strategy. Members-only L advantages have a lot to do with informal institutions. In particular, and sometimes most fundamental is the ‘know-who’ (Narula, 2002). Building up links with various actors (analogous with ‘trust’ and ‘relationship capital’) is time-consuming and expensive, but once created, these links have a low marginal cost of maintenance. Spillovers tend indeed to be more intense between parties that are located close to each other in space (Jaffe and Trajtenberg, 1996; Jaffe, Trajtenberg and Henderson, 1993; Maurseth and

Verspagen, 2002). There are distinct advantages of agglomeration that are only available to those that are collocated, in part because they share the same informal institutions. Thus, they are quasi-public goods, for which firms located there have invested in to acquire knowledge of these institutions (Narula and Santangelo, 2009).

A still-nebulous concept: to what extent is collocation an advantage?

The subjective nature of L advantages and, especially, of collocation L advantages, opens the discussion to whom and in which conditions these are beneficial or detrimental to economic activities and, in particular, to strategic activities such as innovation.

Against the distinct development of research on location in economic geography and international business, the two communities have both devoted great attention to innovation (Howells and Bessant, 2012). Geographers have studied innovation in connection to the geographical environment where the innovative activities are carried out. In this context, the notions of industrial agglomeration (Isard and Schooler, 1959; Marshall, 1920; Weber, 1909), industrial districts (Amin, 1989; Sunley, 1992) and spatial clusters (Bathelt, Malmberg and Maskell, 2004) have been useful to identify the characteristics of geographically bounded environments influencing new knowledge creation and innovation outputs (Cooke, 2001). International business scholars have instead investigated MNE's knowledge sourcing and innovative activity across borders as well as knowledge management and transfer within the MNE's geographically dispersed network (for a review see e.g., Cantwell, 2017). Strategic asset-seeking investments by MNEs are explained with the intent to tap into pockets of expertise in geographically distant locations in order to explore competence and technological opportunities complementary to the ones MNEs already own and/or enjoy in their home country context (Almeida, 1996; Almeida and Phene, 2004; Cantwell and Santangelo, 1999, 2000; Phene and Almeida, 2008). The growth of strategic-asset seeking investments by emerging multinationals in advanced countries (Elia and Santangelo, 2017) and R&D offshoring from advanced countries to emerging economies (D'Agostino and Santangelo, 2012), reveals that the mission of foreign subsidiaries goes beyond the exploitation of headquarter knowledge to include the exploration and absorption of knowledge developed in the host location (Cantwell and Mudambi, 2005; Kuemmerle, 1997). The different role of foreign subsidiaries also arises a plethora of issues related to intra-MNE structure, coordination, and control in connection with knowledge transfer and sharing across space (Ambos, Ambos and Schlegelmilch, 2006; Minbaeva and Santangelo, 2017; Noorderhaven and Harzing, 2009; Rabbiosi and Santangelo, 2013).

Although the economic geography and international business communities have developed parallel research agendas that have had limited interaction until very recently (see e.g., Beugelsdijk

and Mudambi, 2013), scholars in both communities have devoted close attention to the notion of innovation networks, knowledge, spillovers and proximity among different actors (i.e., competitors, collaborators, suppliers, customers, governments, and agencies). Economic geographers have emphasized that proximity does not guarantee immediate knowledge spillovers because benefitting from proximate innovation network relationships requires intentional investments in these relationships (Maskell, 2002). At the same time, international business scholars have nuanced the argument that knowledge spillovers from proximate actors within the MNE's innovation network are unambiguously beneficial, drawing attention on inward *versus* outward, and intended *versus* unintended knowledge spillovers (Alcácer, 2006; Cantwell and Santangelo, 2002; Perri, Andersson, Nell and Santangelo, 2013; Santangelo, 2012).

These distinctions have fuelled the argument that MNEs have to deal with collocation advantages and disadvantages when crossing international borders and designing their innovation strategy (Narula and Santangelo, 2009, 2012). Embeddedness in multiple local contexts creates opportunities, but also raises challenges, particularly in terms of stressing the bandwidth of managers who must handle the increasingly technological and institutional complexity (Meyer et al., 2011; Santangelo, Meyer and Jindra, 2016). Therefore, on the one hand, multinationals may wish to collocate with unaffiliated firms (e.g. suppliers, competitors, or customers) to internalize L advantages in order to enhance and create firm-specific advantages (Dunning, 1998); on the other, they may either deliberately avoid collocating (Alcácer, 2006) or resort to strategies to monitor collocated partners (Narula and Santangelo, 2009) in order to limit dissipation of unintended knowledge flows. Both collocation advantages and disadvantages are not automatic, and critically depend on the public goods nature of the L advantages to be internalized, the level of competition, MNE technological leadership and insidership in the host location (Alcácer and Chung, 2007; Cantwell and Santangelo, 2002; Cantwell and Mudambi, 2011). However, despite this still-lively debate, we do not as yet have a clear picture of the boundary conditions under which collocation can be an advantage or a disadvantage.

A number of other important areas of discussion, which are still exploratory, are also yet to be integrated into the debate about collocation and the MNE.

The first of these is the discussion on *urbanisation* as distinct from *agglomeration*. Over the years, economists refined Marshall's original idea of agglomeration to include other advantages that producers derive from within-industry collocation. Arrow (1962) pointed to the greater and more rapid diffusion of skills through "learning-by-doing" as the labor market expands with more collocating firms, while Romer (1986) argued that technology spillovers that occur within industry clusters generate increasing returns which only accrue to collocating firms. All of these advantages

derived by producers are nontraded positive externalities; in the economics and economic geography literatures they are clubbed together under the term Marshall-Arrow-Romer (MAR) externalities (Mudambi and Swift, 2012).

Porter (2003) added to this literature stream, arguing that low search costs imply that collocated firms have more to lose from falling behind their competitors. Hence they have stronger incentives to innovate themselves as well as to rapidly imitate the innovations that they observe around them, leading to superior performance relative to their non-collocated peers. It may be seen that both MAR and Porter externalities are advantages stemming from *agglomeration*, i.e., they occur through the collocation of like activities that produce increasing specialization within industries.

In contrast, Jacobs (1969) highlights the importance “of inter-industry diversity and technological complementarities for the emergence of new innovations” (Mudambi and Swift, 2012, 4). In the economic geography and regional studies literature, this idea has been developed into the concept of “related variety” (Frenken, Oort and Verburg, 2007). Hence, new, value-creating innovations are more likely to arise at the intersections of technologies and these advantages are based on the presence of diverse knowledge bases. These nontraded externalities are generally termed Jacobs externalities and they are associated with urban scale rather than specialization. Thus, Jacobs externalities are associated with *urbanization*, i.e., larger cities, *ceteris paribus*, tend to be more diverse.¹

These two viewpoints differ along a number of theoretical dimensions. These include the focal unit of analysis, the process through which new knowledge is created and the nature of the resulting innovation. Therefore, they represent complementary approaches to understanding collocation. MAR and Porter externalities stemming from agglomeration and resulting in increasing specialization focus, in the main, on the advantages flowing to individual firms; whereas Jacobs externalities associated with urbanization emphasize the benefits that accrue to locations. Externalities stemming from specialization largely affect extant firms, and the underlying assumption is that these firms are mature and often large. Externalities arising from variety and the co-existence of diverse knowledge bases are usually leveraged through the creation of new firms (Klepper and Sleeper, 2005) and are therefore seen in the process of entrepreneurship. Finally, applying the lens of evolutionary economics (Nelson and Winter, 1982), this implies that MAR and Porter externalities are likely to be lead to incremental innovation, while Jacobs externalities are more likely to be associated with architectural and radical innovation (Henderson and Clark, 1990; Mudambi, 2008).

¹ The *ceteris paribus* clause would lead us to compare Tokyo, for instance, with another smaller Japanese city like Nagoya rather than a city in Europe that would differ along many more dimensions than simply size. In general, we expect to find the larger city to be more diverse.

A second important area of discussion relates to the newly emerging research stream on *microgeography* (Feldman, 2014). This approach specifies that location effects operate at a much smaller scale than suggested by previous research. The “local” scale had previously been specified to be the city, city region, industrial district or cluster. However, microgeography studies have documented local advantage arising within very small city neighborhoods based on co-ethnic ties (Stallkamp, Pinkham, Schotter and Buchel, 2018) and even from ties formed by idiosyncratic office locations within buildings (Catalini, 2018). This research stream suggests an entirely new unit of analysis for location that provides a rich avenue for both theory development and empirical investigation.

These conceptual directions are sure to add richness to our understanding of collocation and location, and are doubtless likely to contribute to a better understanding of location and collocation of MNE innovative activity.

Contributions in this special issue

The contributions to this special issue are an initial step to a clearer conceptualisation of the still-nebulous concept of collocation and the extent to which collocation is an advantage. These contributions introduce us to several important sets of questions that will require further study (see Table 2).

TABLE 2 ABOUT HERE

The first set of questions relates to *the rise of knowledge-intensive intangibles*. This phenomenon has implications for MNEs’ location and organizational strategies. Against significant research on the role of socio-spatial aspects influencing duration, composition, performance, and coevolution of MNE activity, there is limited understanding of how subnational regions coordinate with investment over time. The paper by *Sinéad Monaghan, Patrick Gunnigle and Jonathan Lavelle* (in this special issue) starts addressing this issue by exploring how subnational regions, and their composite institutions, function in coordinating – or not – to attract multinational investments and facilitate collocation advantage. Based on case study analysis, Monaghan and colleagues illustrate the potential variation and implications of subnational institutional structure, posturing, and engagement with FDI. In addition to the role of subnational variation for MNEs, their findings offer insights into industrial policy for developed countries, a theme close to the gear of the innovation study community.

International new ventures are also actors for which the rise of knowledge-intensive intangibles bears relevant implication. These ventures from inception seek to derive significant competitive advantage from the use of resources and the sale of outputs in multiple countries (Oviatt

and McDougall, 1994) and typically proliferate in technology-intensive sectors. Thus, they are especially sensitive to inward and outward localized knowledge spillovers and associated collocation advantage and disadvantage. *Elisabeth Mack, Kevin Credit and Matthew Suandi* (in this special issue) explore this issue by investigating the variations in firms' collocation behaviour in the Detroit metropolitan area. Their study highlights that foreign rather than domestic firms may be the primary source of knowledge spillovers, but with new domestic standalone ventures having been crowded out from cluster activities. These findings thus call for policy intervention to integrate new standalone ventures into collaborative ventures with other firms in the region.

Still related to the rise of knowledge-intensive intangibles, there is the potential shift of collocation advantage in disadvantages and vice versa. Given the subjective nature of collocation L advantages, the perceived importance of MNEs cognitive, social, organizational and institutional, in addition to geographical, proximity gains a prominent role in the MNEs' collocation decision of strategic assets. *Niels Le Duc and Johan Lindeque* (in this special issue) examine the role of all these five dimensions of proximity. Their study of MNE collocation in three Dutch science parks reveals that all five proximity dimensions play a role, but organizational proximity emerges as the most important factor influencing MNE collocation. In addition, in contrast to expectations for a high degree of relatedness and reinforcing effects between the five types of proximity, Le Duc and Lindeque's study indicates that an 'optimal' proximity constellation of low organizational proximity together with high social and cognitive proximity fosters MNE collocation in knowledge-intensive clusters.

The second set of questions that could effectively contribute to a common research agenda connecting together the international business, economic geographers and innovation communities speaks to the *risks of knowledge dissipation MNEs face when developing innovative activities in (multiple) foreign locations*. MNEs are more exposed to these risks when outsourcing research and development services rather than when they carry out these activities in-house in foreign greenfield facilities. Such risks have challenged multinationals to design ad hoc strategies to protect their ownership advantages. And, modularity has been one of those strategic solutions (Zhao, 2006). The situation may be more complex when the supplier of the MNE also serves the MNE's competitors because they may act as hubs for knowledge transfers, exposing their clients to the risk of knowledge leakages to their competitors. This is the focus of the study by *Andrea Martínez-Noya and Esteban García-Canal* (in this special issue), who investigate the appropriability regime of the outsourcing location in terms of intellectual property rights protection within the country, as well as on the tacit and specific nature of the service outsourced. Based on transaction cost argument and using primary data on the transactions of EU and US technology-intensive firms, they show that sharing R&D

suppliers with competitors appear to mimic some of the advantages and disadvantages of being collocated with them, especially in countries offering weak IPR protection.

A further set of questions, we believe, is critical to advance a common research agenda across the three communities relates to *the nature of collocation advantages and/or disadvantages MNEs face* in emerging markets. In particular, it would be interesting to investigate whether these advantages and/or disadvantages would be different than in advanced economies and whether the boundary conditions for collocation advantages/disadvantage would be different in emerging market clusters. These are topics that we would like to have covered in this special issue but were not able to. Thus, these are questions that are left open, and which we see scope to invest research effort for in order to shed light on the still-nebulous concept of collocation and the extent to which collocation is an advantage. Despite the lack of a comprehensive coverage of the research question associated to the issue at hand, we do believe that each of the contributions in this special and all of them as a block represents a first valuable attempt toward gaining a more comprehensive knowledge of the organizational and geographical dimension of cross-border innovative activities.

We are then confident that this lead paper together with the contributions to the special issue have taken the discussion further by setting a research agenda that scholars in the international business, economic geography, and innovation study communities can develop further hopefully with greater awareness of each other knowledge.

Appendix: This special issue

The call for papers for this special issue was published in summer 2015. By the deadline of 31 January 2016, we received 24 papers from scholars based in 13 different countries (i.e., Brazil, China, France, Germany, Ireland, Italy, Korea, Netherlands, Spain, Switzerland, Taiwan, United Kingdom, and United States) across three continents. Of these papers, 4 were desk rejected and 21 were sent out for review.

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References

- Aharoni, Y. (1966). The Foreign Investment Decision Process, The Internationalization of the Firm, 3.
- Alcácer, J. (2006) Location Choices across the Value Chain: How Activity and Capability Influence Collocation. *Management Science* 52, pp. 1457–1471.
- Alcácer, J. and Chung, W. (2007) Location strategies and knowledge spillovers. *Management Science* 53, pp. 760–776.
- Almeida, P. (1996) Knowledge sourcing by foreign multinationals: Patent citation analysis in the US semiconductor industry. *Strategic Management Journal* 17, pp. 155-165.
- Almeida, P. and Phene, A. (2004) Subsidiaries and knowledge creation: The influence of the MNC and host country on innovation. *Strategic Management Journal* 25, pp. 847-864.
- Ambos, T.C., Ambos, B. and Schlegelmilch, B.B. (2006) Learning from foreign subsidiaries: An empirical investigation of headquarters' benefits from reverse knowledge transfers. *International Business Review* 15, pp. 294-312.
- Amin, A. (1989) Flexible specialisation and small firms in Italy: Myths and realities. *Antipode* 21, pp. 13-34.
- Amsden, A.H., (1992) *Asia's next giant: South Korea and late industrialization*. Oxford University Press, Oxford.
- Arrow, K. (1962). Economic welfare and the allocation of resources for invention, in: Research, N.B.o.E. (Ed.), The rate and direction of inventive activity: Economic and social factors Princeton University Press, pp. 609-626.
- Bathelt, H., Malmberg, A. and Maskell, P. (2004) Clusters and knowledge: Local buzz, global pipelines and the process of knowledge creation. *Progress in Human Geography* 28, pp. 31-56.
- Beugelsdijk, S., McCann, P. and Mudambi, R. (2010) Introduction: Place, space and organization—economic geography and the multinational enterprise. *Journal of Economic Geography* 10, pp. 485-493.
- Beugelsdijk, S. and Mudambi, R. (2013) MNEs as border-crossing multi-location enterprises: The role of discontinuities in geographic space. *Journal of International Business Studies* 4, pp. 413-426.
- Cantwell, J. (2017) Innovation and international business. *Industry and Innovation* 24, pp. 41-60.
- Cantwell, J. and Mudambi, R. (2005) MNE competence - creating subsidiary mandates. *Strategic Management Journal*, 26, pp. 1109-1128.
- Cantwell, J. and Santangelo, G.D. (1999) The frontier of international technology networks: Sourcing abroad the most highly tacit capabilities. *Information Economics and Policy* 11, pp. 101-123.
- Cantwell, J. and Santangelo, G.D. (2000) Capitalism, profits and innovation in the new technological paradigm. *Journal of Evolutionary Economics* 10, pp. 131-157.
- Cantwell, J. and Santangelo, G.D. (2002) The new geography of corporate research in information and communications technology (ICT). *Journal of Evolutionary Economics* 12, pp. 163-197.
- Cantwell, J.A., (1989) *Technological Innovation and Multinational Corporations*. Oxford.
- Cantwell, J.A. and Mudambi, R. (2011) Physical attraction and the geography of knowledge sourcing in multinational enterprises. *Global Strategy Journal* 1, pp. 206-232.
- Catalini, C. (2018) Microgeography and the direction of inventive activity. *Management Science* 10.1287/mnsc.2017.2798, pp.
- Cooke, P. (2001) Regional innovation systems, clusters, and the knowledge economy. *Industrial and Corporate Change* 10, pp. 945-974.
- D'Agostino, L.M. and Santangelo, G.D. (2012) Do overseas R&D laboratories in emerging markets contribute to home knowledge creation? *Management International Review* 52, pp. 251-273.
- Dunning, J.H., (1958) *American investment in British manufacturing industry*. Taylor & Francis US.

- Dunning, J.H. (1998) Location and the multinational enterprise: a neglected factor? *Journal of International Business Studies* 29, pp. 45-66.
- Elia, S. and Santangelo, G.D. (2017) The evolution of strategic asset-seeking acquisitions by emerging market multinationals. *International Business Review* 29, pp. 855-866.
- Feldman, M. (2014) The character of innovative places: entrepreneurial strategy, economic development and prosperity. *Small Business Economics*, 3, pp. 9-20.
- Frenken, K., Oort, F. and Verburg, T. (2007) Related variety, unrelated variety and regional economic growth. *Regional Studies* 41, pp. 685-697.
- Håkanson, L. (1975) Location and growth of the firm: inductive approaches to the study of industrial location. *Economic Research Institute at the Stockholm School of Economics, Working Paper 6045*, pp.
- Hamilton, A., (1913) *Report on Manufactures: Communication to the House of Representatives Dec. 5, 1791 from Alexander Hamilton on the Subject of Manufactures*. US Government Printing Office.
- Henderson, R. and Clark, K. (1990) Architectural innovation: the reconfiguration of existing product technologies and the failure of established firms. *Administrative Sciences Quarterly* 35, pp. 9-30.
- Howells, J. and Bessant, J. (2012) Introduction: Innovation and economic geography: A review and analysis. *Journal of Economic Geography* 12, pp. 929-942.
- Isard, W. and Schooler, E.W. (1959) Industrial complex analysis, agglomeration economics and regional development. *Journal of Regional Science* 1, pp. 19-33.
- Jacobs, J., (1969) *The Economy of Cities*. Random House, New York.
- Jaffe, A. and Trajtenberg, M. (1996) Flows of Knowledge from Universities and Federal Labs: Modelling the Flow of Patent Citations Over Time and Across Institutional and Geographic Boundaries. *NBER Working Papers No. 5712*, pp.
- Jaffe, A., Trajtenberg, M. and Henderson, R. (1993) Geographical localisation of knowledge spillovers, as evidenced by patent citations. *Quarterly Journal of Economics* 58, pp. 577-598.
- Jones, G., (2005) *Multinationals and Global Capitalism: From the Nineteenth Century to the Twenty-First Century*. Oxford University Press, Oxford.
- Klepper, S. and Sleeper, S. (2005) Entry by spinoffs. *Management Science* 51, pp. 1291-1306.
- Kuemmerle, W. (1997) Building effective R&D capabilities. *Harvard Business Review* March-April, pp. 61-70.
- Kunitake, K., (2009) *Japan Rising: The Iwakura Embassy to the USA and Europe* Cambridge University Press, Cambridge.
- List, F., (2016) *The Natural System of Political Economy*. Routledge, London.
- Malmberg, A. and Maskell, P. (2006) Localized learning revisited. *Growth and Change* 37, pp. 1-18.
- Marshall, A., (1920) *Principles of Economics*. Macmillan, London.
- Maskell, P. (2002). Future challenges and institutional preconditions for regional development policy, in: Feldman, M.P., Massard, N. (Eds.), *Institutions and Systems in the Geography of Innovation*. Springer, New York, pp. 341-365.
- Maurseth, P. and Verspagen, B. (2002) Knowledge spillovers in Europe: a patent citations analysis. *Scandinavian Journal of Economics* 104, pp. 531-545.
- Meyer, K., E. , Mudambi, R. and Narula, R. (2011) Multinational enterprises and local contexts: The opportunities and challenges of multiple embeddedness. *Journal of Management Studies* 48, pp. 235-252.
- Minbaeva, D. and Santangelo, G.D. (2017) Boundary spanners and intra - MNC knowledge sharing: The roles of controlled motivation and immediate organizational context. *Global Strategy Journal* <https://doi.org/10.1002/gsj.1171>, pp. 1-22.
- Mudambi, R. (2008) Location, control and innovation in knowledge-intensive industries. *Journal of Economic Geography* 8, pp. 699-725.

- Mudambi, R. and Swift, T. (2012) Multinational enterprises and the geographic clustering of innovation. *Industry and Innovation* 19, pp. 1-21.
- Narula, R. (2002) Innovation systems and 'inertia' in R&D location: Norwegian firms and the role of systemic lock-in. *Research Policy* 31, pp. 795-816.
- Narula, R. (2012) Do we need different frameworks to explain infant MNEs from developing countries? *Global Strategy Journal* 2, pp. 188-204.
- Narula, R. (2014a) Exploring the paradox of competence-creating subsidiaries: balancing bandwidth and dispersion in MNEs. *Long Range Planning* 47, pp. 4-15.
- Narula, R. (2014b). The limits of "new" multinational enterprises: Institutions, systems, and 'members-only' location advantages, in: Cuervo-Cazurra, A., Ramamurti, R. (Eds.), *Understanding multinationals from emerging markets* Cambridge University Press, Cambridge, pp. 81-107.
- Narula, R. and Santangelo, G.D. (2009) Location, collocation and R&D alliances in the European ICT industry. *Research Policy* 38, pp. 393-403.
- Narula, R. and Santangelo, G.D. (2012) Location and collocation advantages in international innovation. *Multinational Business Review* 20, pp. 6-25.
- Nelson, R. and Winter, S., (1982) *An Evolutionary Theory of Economic Change*. Belknap Press of the Harvard University Press, Cambridge MA.
- Noorderhaven, N. and Harzing, A.W. (2009) Knowledge-sharing and social interaction within MNEs. *Journal of International Business Studies* 40, pp. 719-741.
- Oviatt, B.M. and McDougall, P.P. (1994) Toward a Theory of International New Ventures. *Journal of International Business Studies* 25, pp. 45-64.
- Perri, A., Andersson, U., Nell, P.C. and Santangelo, G.D. (2013) Balancing the trade-off between learning prospects and spillover risks: MNC subsidiaries' vertical linkage patterns in developed countries. *Journal of World Business* 48, pp. 503-514.
- Phene, A. and Almeida, P. (2008) Innovation in multinational subsidiaries: The role of knowledge assimilation and subsidiary capabilities. *Journal of International Business Studies* 39, pp. 901-919.
- Porter, M. (2003) The economic performance of regions. *Regional Studies* 37, pp. 549-578.
- Rabbiosi, L. and Santangelo, G.D. (2013) Parent company benefits from reverse knowledge transfer: The role of the liability of newness in MNEs. *Journal of World Business* 48, pp. 160-170.
- Romer, P.M. (1986) Increasing returns and long-run growth. *Journal of Political Economy* 94, pp. 1002-1037.
- Santangelo, G.D. (2012) The tension of information sharing: Effects on subsidiary embeddedness. *International Business Review* 21, pp. 180-195.
- Santangelo, G.D., Meyer, K.E. and Jindra, B. (2016) MNE subsidiaries' outsourcing and insourcing of R&D: The role of local institutions. *Global Strategy Journal* 6, pp. 247-268.
- Stallkamp, M., Pinkham, B., Schotter, A. and Buchel, O. (2018) Core or periphery? The effect of country-of-origin agglomerations on within-country expansions of MNEs. *Journal of International Business Studies* 10.1057/s41267-016-0060-x., pp.
- Sunley, P. (1992) Marshallian industrial districts: the case of the Lancashire cotton industry in the inter-war years. *Transactions of the Institute of British Geographers, New Series* 17, pp. 306-320.
- Vernon, R. (1966) International investment and international trade in the product cycle. *The Quarterly Journal of Economics* 80, pp. 190-207.
- Wade, R., (1990) *Governing the market: Economic theory and the role of government in East Asian industrialization*. Princeton University Press, Princeton.
- Weber, A., (1909) *Theory of the Location of Industries*. University of Chicago Press, Chicago.
- White, R.E. and Poynter, T.A. (1984) Strategies for foreign-owned subsidiaries in Canada. *Business Quarterly* 49, pp. 59-69.

Zhao, M. (2006) Conducting R&D in countries with weak intellectual property rights protection.
Management Science 52, pp. 1185-1199.

Table 1. A classification of L advantages

	TYPE OF L ADVANTAGES	SOURCES OF L ADVANTAGES	EXAMPLE OF L ADVANTAGES
Macro-region/country-level L advantages	Exogenous L advantages	These derive from natural assets (independent of development stage)	Sociological/anthropological - Culture, norms, religion, political stability. - Land availability, rainfall, climate, extractive resources, basic population - Proximity and accessibility to other markets
	Fundamental L advantages	Basic infrastructure	- Primary schools - Health care - Transport (roads, railways) - Utilities (electricity, water) - Telecoms - Ports - Efficient bureaucracy - Public transport
		Legal infrastructure	- Legal system - Security and police - Tariff system - Property rights - Tax and excise
		Regulation and policy	- Incentives - Subsidies - Tax holidays - Regulatory agencies - Industrial policy - Competition policy - Capacity to enforce regulation
		Financial infrastructure	- Banking, insurance, stock exchange
Industry-level L advantages	Knowledge asset L advantages	Knowledge infrastructure	- Tertiary education, universities - Public research institutes
	Structural L advantages	Market and demand structure	- Income distribution - Size of potential market - Wage rates - Skilled employee mobility/scarcity
	Collocation L advantages	L advantages that derive from the presence of other actors in the same location	- Agglomeration economies - Networks of suppliers - Networks of customers - Level of intra-industry competition - Concentration ratio - Market size and potential - Presence of support industries (inter-industry)
		Industrial policy	- Specific policies associated with given industry
		L advantages that derive from location-bound O advantages of other actors	- Presence of significant customer - Presence of significant supplier
Firm-associated L advantages			

Source: Narula and Santangelo (2012)

Table 2. Summary of papers in the issue

<i>Authors</i>	<i>Actors perceiving collocation advantage/disadvantage</i>	<i>Geographical unit of analysis</i>	<i>Boundary conditions determining collocation advantage vs. disadvantage</i>
Sinéad Monaghan, Patrick Gunnigle and Jonathan Lavelle	MNEs	Subnational regions	Subnational regional institutions
Elisabeth Mack, Kevin Credit and Matthew Suandi	Foreign and domestic firms, and new domestic standalone ventures	Metropolitan area	Liability of foreignness, liability of newness, technological spillovers, industry leadership
Niels Le Duc and Johan Lindeque	MNEs	Science Park	Optimal proximity constellation of low organizational proximity together with high social and cognitive proximity between MNEs
Andrea Martínez-Noya and Esteban García-Canal	Foreign firms outsourcing R&D	Country	Sharing R&D suppliers with competitors